

SPATIAL COMPOSITION OF THREE INTERMOUNTAIN SETTLEMENTS LOCATED ON SLOPES IN NORTHERN AND CENTRAL TURKEY

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Keywords: settlement, mountain, slope, topography, climate, house, road, mosque, square, roof

Introduction

For designing, constructing, and conserving human and sustainable living environments, we focused on the spatial compositions of intermountain settlements located on slopes. We conducted documentary searches and field surveys of three settlements in northern and central Turkey. From them, we discussed the relationships among the topographies, the lives of residents, the buildings, and the roads to determine the spatial characteristics of the settlements.

Methods

We selected three settlements (Fig. 1). Bolkuş in Karabük Province is surrounded by green mountains. Demirdağ in Divriği District, Sivas Province, is surrounded by bald mountains. Çiğdemlik in Amasya Province is at the intermediate location between them.

We conducted our documentary searches and field surveys in them. In our documentary search, we mainly collected the temperature and the precipitation of the nearest city or town [1], satellite images [2], topography [3], and outlines of each settlement from the Internet. In the field surveys conducted from March 10-14, 2011, many photographs were taken, and residents were interviewed when possible.



Fig.1: Locations of three settlements in Turkey [2]
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Results

COMPARISONS OF TEMPERATURES AND PRECIPITATION

We compared the monthly mean temperatures and precipitation in Karabük City (about 15 km east of Bolkuş), Amasya City (about 13 km southwest of Çiğdemlik), and Divriği Town (about 6 km south of Demirdağ) (Fig. 2, 3).

The four seasons are clearly differentiated in these cities, as in Istanbul. The differences of the mean annual precipitation in Karabük (488 mm), Amasya (447 mm), and Divriği (387 mm) [1] are lower than that in Istanbul (697 mm). The precipitation in summer (Jun. to Sep.) is lower than in winter. Karabük has the highest precipitation in summer, followed by Amasya and Divriği. The Köppen-Geiger climate classification [4] places Karabük in the humid subtropical climate, like most of Japan and parts of China and South Korea, and Amasya and Divriği in the Mediterranean climate in the Mediterranean Basin. The two climates are classified based on

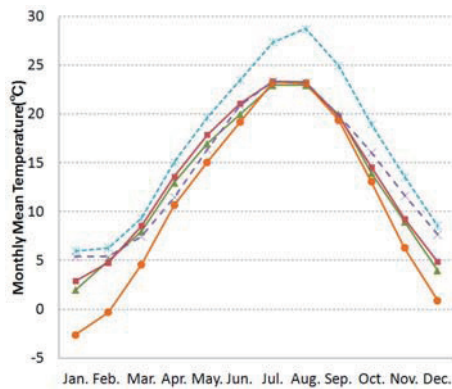


Fig. 2: Comparisons of monthly mean temperatures [1]

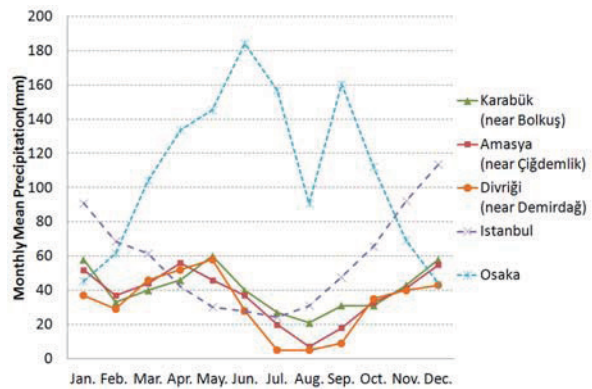


Fig. 3: Comparisons of monthly mean precipitation [1]

summer precipitation, which seems to affect the mountain vegetation. Below are the results of our documentary searches and field surveys for each settlement.

BOLKUŞ

Documentary search [2][5]

Geography (Fig. 4, 5): Two independent settlements are surrounded by green mountains. Filyos River, State Road D030, and a railway run through the bottom of the valley. The south settlement is located on the gentle slope of the river's south side. The north settlement, called Yalnızca, is on the steep slope, which is about 120 to 200 m higher than the south.

History: People have lived here from the Ottoman Empire.

Population: 197 (in 2000, total of two settlements)

Economy: The main industry is forestry. Some of the residents work in iron and steel industries.

Field survey (March 10, 2011) Below are the results in the north settlement, Yalnızca.

Settlement: Houses were clustered in an area from which the residents regularly walked to the mosque (Fig. 6). There was a little square in front of the mosque around which the settlement's community was centered (Fig. 7). Men gathered before prayer times at the mosque and converse with each before and after prayer.

No road ran parallel to the contours. Every road was steeply sloped (Fig. 8-10). The houses were lined near the roads. Plowlands were mainly spread on the outer



Fig. 5: Closeup satellite image, contours and map of Bolkuş Yalnızca Settlements 1:5,000

Satellite image in 2005 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (10 m intervals) [3][6] : GeoMapApp © <http://www.geomapp.org>

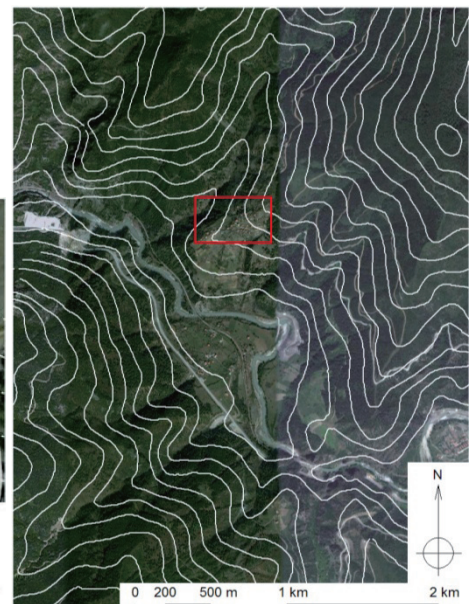


Fig. 4: Satellite image and topography of Bolkuş Village 1:50,000

See Fig. 5 for closeup in framed rectangle.
Satellite image in 2005 and 2011 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (50 m intervals) [3][6] : GeoMapApp © <http://www.geomapp.org>



Fig. 6: Appearance of Bolkuş Yalnızca Settlement



Fig. 7: Square in front of mosque



Fig. 8: Upslope road in settlement



Fig. 9: Downslope road in settlement



Fig. 10: Downslope road in settlement



Fig. 11: Gabled wooden house popular in settlement



Fig. 12: Gable sides faced valley



Fig. 13: Masonry walls used in downstairs

side of the settlement. Roads connected the settlement's inside and outside and led to the mosque, the mountains, and the plowland paths. No paths had been developed that connected the higher and lower houses like stairs.

Buildings: Many gabled houses shared similar scales sides faced the valley (Fig. 11, 12, 14). They created a sense of unity among the houses when they were viewed from the other side of the river (Fig. 6).

Many houses were wooden. In some of them, masonry constructions were used downstairs to effectively use the slope (Fig. 13). There were only minimal land formations with low retaining walls.

Unlike the other houses, the mosque faced Mecca (south-southeast). Its form and color were different from the other houses (Fig. 7).

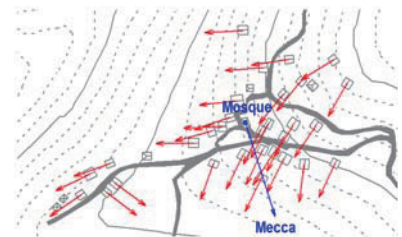


Fig. 14: Aspects of gable houses and mosque in Bolkuş Yalnızca Settlements 1:10,000

Contours (10 m intervals) [3][6]; GeoMapApp © <http://www.geomapapp.org>

ÇİĞDEMLİK

Documentary search [2][7]

Geography (Fig. 15, 16): The settlement is surrounded by green mountains. However, parts of the mountainsides near the settlement have just a few trees. Yeşilirmak River and State Road D100 run through the bottom of the valley.

History: Pontic Greeks formerly lived in the settlement and called it Zana. After the Treaty of Lausanne in 1923, the Greeks migrated to Greece, and the number of Turkish residents increased. Now the Turks call it Çiğdemlik, which means crocus flowers.

Population: 543 (in 2000)

Economy: Cherries, peaches, grapes, apricots, apples, plums, pears, and okra are grown.

Field survey (March 12, 2011)

Settlement: The settlement was on a slope from the state road through the upslope road. The houses were spread like a fan. A



Fig. 15: Satellite image and topography of the Çiğdemlik Village 1:50,000 See Fig. 16 for closeup in framed rectangle.

Satellite image in 2010 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 GeoEye
Contours (50 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>

low hill and trees on the west side complicated obtaining a full view of the settlement from the bottom of the valley (Fig. 17, 18).

A small pond and a primary school were located at the settlement's entrance. A square was found at the center of the settlement. The village head office and a small snack shop faced the square (Fig. 19).

A mosque being reconstructed was very close to the square. The mosque was on the site of the former mosque.

The slope roads branched from a road running east to west along a gully (Fig. 20). Few paths connected the higher and lower houses.

Buildings: The old houses shared a characteristic facade with an overhanging gable, a front wall, and a window upstairs (Fig. 21-23). The facade faced the lower altitude rather than the nearby road (Fig. 25). Some of the houses were visible from the lower altitudes with hipped roofs and a small gable and from higher altitudes as one gabled wall (Fig. 24). The color of the



Fig. 16: Closeup satellite image, contours and map of Çiğdemlik Settlement 1:5,000
 Satellite image in 2010 [2] : © 2012 Google, Image © 2012 GeoEye Contours (10 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>

to the square. The mosque was on the site of the former mosque. The slope roads branched from a road running east to west along a gully (Fig. 20). Few paths connected the higher and lower houses.

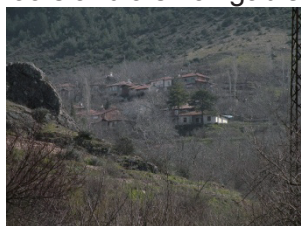


Fig. 17: Appearance of Çiğdemlik partially hidden by hill on the left.



Fig. 18: Houses spread like a fan



Fig. 19: Square. Village head office was in building on the right.

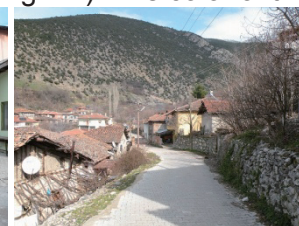


Fig. 20: Road in settlement

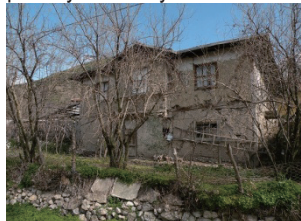


Fig. 21: House with characteristic facade



Fig. 22: House with characteristic facade



Fig. 23: Masonry walls used downstairs.



Fig. 24: Gable wall of house visible from higher altitudes.

walls of the houses varied. However, the red roofs of most houses created a sense of unity when viewed from a distance (Fig. 17, 18).

There were many two-story wooden houses. In some of them, masonry construction was used downstairs (Fig. 23). There were only minimal land formations with low retaining walls.

Unlike the other houses, the mosque under reconstruction faced Mecca (south-southeast).

DEMİRDAĞ

Documentary search [2][8]

Geography (Fig. 26, 27): The settlement is surrounded by gentle bald mountains. Trees are limited to inside the settlement and near a stream.

History: The settlement was formerly called Purunsur. After the foundation of the Turkish Republic, it was named Demirdağ, which means iron mountain.

Population: 67 (in 2007)

Economy: Wheat and feed grains like barley, vetch, and clover are cultivated.

Field survey (March 14, 2011)

Settlement: The settlement was on a slope approached from the main road through a downslope road and a bridge over a stream (Fig. 28, 29). There was a square in its center (Fig. 30). A primary school at the west edge of the settlement had been closed. There was no mosque in the settlement. Many settlements around Divriği have no mosques.

Relatively high densities of houses were found inside this settlement (Fig. 31, 32). Some houses with wooden upstairs had already collapsed and only the masonry or mud downstairs remained (Fig. 33).

Buildings: Many houses had hipped or pavilion roofs. Although some houses had gable roofs, few gable walls faced the lower altitudes. The walls of the houses varied in color. However, red roofs and the similar scales of most of the houses created a sense of unity when viewed from a distance (Fig. 26). Some houses had overhanging upstairs (Fig. 34, 35).



Fig. 25: Aspects of facades in Çiğdemlik Settlements 1:10,000

Contours (10 m intervals) [3][6]: GeoMapApp © <http://www.geomapapp.org>

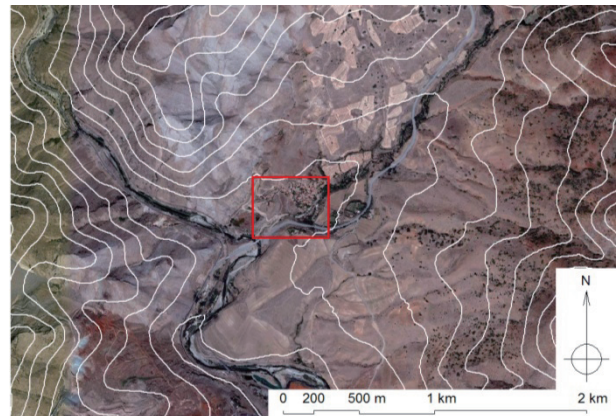


Fig. 26: Satellite image and topography of Demirdağ Village 1:50,000. See Fig. 27 for closeup in framed rectangle.

Satellite image in 2006 [2]: © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
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Fig. 27: Closeup satellite image, contours and map of Demirdağ Settlement 1:5,000

Satellite image in 2006 [2]: © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (10 m intervals) [3][6]: GeoMapApp © <http://www.geomapapp.org>



Fig. 28: Appearance of Demirdağ Settlement



Fig. 29: Entrance of settlement



Fig. 30: Square at center of settlement



Fig. 31: Density of houses inside settlement



Fig. 32: Dense houses inside settlement



Fig. 33: House with collapsed wooden upstairs in front.



Fig. 34: House with overhanging upstairs



Fig. 35: House with overhanging upstairs

Discussion

Our documentary researches and field surveys of the three settlements showed the following characteristics of spatial compositions:

- (1) The roads in each settlement branch from the mosque or the square. Houses are gathered in the area from where the residents regularly walk to the mosque or the square. The settlement's community is centered on the mosque or the square. The plowlands are mainly spread to the outer side of the settlement.
- (2) Many houses are wooden. Some have masonry or mud downstairs to effectively use slopes. Despite such slope topography, there are only minimal land formations with low retaining walls.
- (3) Each roof faces not a nearby road but the direction of the lower altitudes. Roofs visible outside each settlement share similar shapes, scales, and colors.

Conclusion

We conducted documentary searches and field surveys of three intermountain settlements located on slopes in northern and central Turkey and discussed their spatial compositions. We clarified the followings: (1) The spatial structure, which is centered around a mosque or square, helps community formation. (2) Some wooden houses have masonry or mud downstairs to effectively use slopes. (3) Sharing similar shapes, aspects, scales, and colors of roofs creates a sense of unity in the landscape.

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